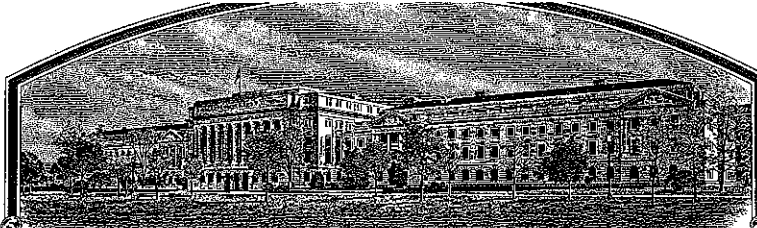


No.

200500267



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Virginia Tech Intellectual Properties, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLACEMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED IN THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE IDENTIFIED BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF SEEDS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Doyce'



In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this fourteenth day of February, in the year two thousand and six.

Attest:

*[Signature]*

Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

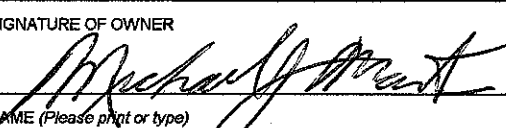
*[Signature]*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**  
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Virginia Tech Intellectual Properties, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME VA00H-137		3. VARIETY NAME Doyce	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Virginia Tech Intellectual Properties, Inc. 1872 Pratt Dr., Suite 1625 Blacksburg, VA 24060		5. TELEPHONE (include area code) 540-951-9378		FOR OFFICIAL USE ONLY	
		6. FAX (include area code) 540-951-5292		PVPO NUMBER <b>200500267</b> FILING DATE MAY 26, 2005	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation		8. IF INCORPORATED, GIVE STATE OF INCORPORATION Virginia		9. DATE OF INCORPORATION June 20, 1985	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE (S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Carl A. Griffey Crop and Soil Environmental Sciences Virginia Tech Blacksburg, VA 24061-0404				F E E S R E C E I V E D FILING AND EXAMINATION FEES: \$ 3,652.00 DATE 05/26/05 CERTIFICATION FEE: \$ 768.00 DATE 1/30/2006	
11. TELEPHONE (include area code) 540-231-9789		12. FAX (include area code) 540-231-3431		13. E-MAIL Cgriffey@vt.edu	
				14. CROP KIND (Common Name) Barley	
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input type="checkbox"/> X Exhibit A. Origin and Breeding History of the Variety b. <input type="checkbox"/> X Exhibit B. Statement of Distinctness c. <input type="checkbox"/> X Exhibit C. Objective Description of Variety d. <input type="checkbox"/> X Exhibit D. Additional Description of the Variety (Optional) e. <input type="checkbox"/> X Exhibit E. Statement of the Basis of the Owner's Ownership f. <input type="checkbox"/> X Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input type="checkbox"/> X Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)			19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input type="checkbox"/> X YES (If "yes", answer items 20 and 21 below) <input type="checkbox"/> NO (If "no," go to item 22)		
			20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? IF YES, WHICH CLASSES? <input type="checkbox"/> X FOUNDATION <input type="checkbox"/> X REGISTERED <input type="checkbox"/> X CERTIFIED		
			21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? IF YES, SPECIFY THE NUMBER 1, 2, 3, etc. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)		
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> X YES <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)			23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input type="checkbox"/> X NO IF YES, GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)		
24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER  NAME (Please print or type) Michael J. Martin			SIGNATURE OF OWNER  NAME (Please print or type)		
CAPACITY OR TITLE Executive Vice President		DATE 5/25/05		CAPACITY OR TITLE DATE	

**GENERAL:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$2,450 (\$300 filing fee and \$2,150 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$300 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office**

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvp.htm>

**ITEM**

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;  
(2) the details of subsequent stages of selection and multiplication;  
(3) evidence of uniformity and stability; and  
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:  
(1) identify these varieties and state all differences objectively;  
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and  
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (*See Regulations and Rules of Practice, Section 97.103*).
21. See Section 83 of the Act for the Contents and Term of Plant Variety Protection.
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.

**21. CONTINUED FROM FRONT** (Please provide a statement as to the limitation and sequence of generations that may be certified.)

**22. CONTINUED FROM FRONT** (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)  
A limited amount of Certified seed of Doyce was sold in the U.S. A. for the first time in October 2004.

**23. CONTINUED FROM FRONT** (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (*See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.*)

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center—East, Beltsville, MD 20705. Telephone: (301) 504-8089.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number for this collection of information is (0581-0055). The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964

**18A. Exhibit A: Origin and Breeding History**

**Genealogy and Breeding Method.**

Doyce was selected from a population developed via a series of crosses comprised of 'Sangregado' sib (CMB79-54)//VA90-42-56//VA90-42-22/3/'Pamunkey'/4/H585. CMB79-54 is a spring barley line obtained from the ICARDA-CIMMYT barley breeding program in Mexico and used as a parent for leaf rust (caused by *Puccinia hordei* G. Otth) resistance. The parentage of VA90-42-56 is 'Barsoy'\*2/5/'Cebada Capa' (PI 539113)/'Wong'//Awnleted 'Hudson'/3/'Harrison'/4/Harrison/3/Cebada Capa/Wong//Awnleted Hudson/6/VA79-44-167. The parentage of VA79-44-167 is Harrison/3/Cebada Capa/ Wong//Awnleted Hudson/4/Harrison/3/Cebada Capa/ Wong//Awnleted Hudson. Parental line VA90-42-22 was derived from the cross VA79-45-101/'Monroe'/'Sussex'. Line VA79-45-101 was derived from an F<sub>2</sub> population comprised of two crosses: 1) CIho 7386/'Surry'//CIho 9623, CIho 9658, CIho 9708, BYDV Resistant 'Atlas'/Many Genotypes; 2) CIho 7386/Surry//Barsoy/'Hanover'. H585 previously tested as SC890585 is a hulless barley cultivar derived from the cross VA75-42-45/SC793556//CIho 2457. The cross from which Doyce originated was completed in spring 1994, and the F<sub>1</sub> generation was grown in the field at Warsaw, VA as a single 4ft headrow in 1995 to produce F<sub>2</sub> seed. The population was advanced from the F<sub>2</sub> to F<sub>4</sub> generation using a modified bulk breeding method.

**Population Advancement and Selection of the Variety.**

Barley spikes were selected from the population in each segregating generation (F<sub>2</sub>-F<sub>4</sub>) on the basis of absence of obvious disease, early maturity, short straw and desirable head type and size. Selected spikes were threshed in bulk, and seed was planted in 225ft<sup>2</sup> blocks at Warsaw and Blacksburg, VA in the fall of each year. Spikes selected from the F<sub>4</sub> bulk were threshed individually and planted at Warsaw, VA in separate 4ft headrows. Doyce was derived as a bulk of one of these F<sub>4.5</sub> headrows selected in 1999. Doyce was evaluated as entry 137 in replicated (Warsaw, VA; Table 7) and non-replicated (Blacksburg, VA) observation nurseries in 2000 and was tested as VA00H-137. In 2001-2002, it was evaluated in Virginia's Official Variety Trials (Tables 1-3) and in Preliminary and Advance barley tests (Tables 4-6).

**Multiplication and Purification.**

An initial source of Doyce Breeder seed was developed in 2001 via thorough removal of visual variant plants from a 0.2-acre F<sub>7</sub> seed-increase strip sown at the VCIA Foundation Seed Farm. This block produced about 20 bushels of Breeder seed that was planted during the fall of 2002 on 30 acres at the Foundation Seed Farm. This seed increase block produce about 2,000 bushels of Doyce Foundation seed that was available for distribution to seedsmen in fall 2003. A purer source of Doyce Breeder seed was developed during the 2001-2002 crop season, wherein 400 headrows of Doyce, each originating from a single spike, were planted and evaluated for homogeneity and trueness of type. Variant headrows were removed prior to harvest, and the remaining 395 F<sub>9</sub> headrows were harvested in bulk. This seed was provided to the Foundation Seed Farm of Virginia Crop Improvement Association, who planted it on 0.9 acres and harvested about 60 bushels of Foundation seed that will be used as stock seed for subsequent increases.

While Doyce has remained stable and uniform in composition through the past three generations of self pollination, variants observed within the variety include up to 0.5% plants having lax spikes, 0.5% plants having awnless spikes or spikes with short awns, 0.3% plants 4 to 6 inches taller in height, and 0.1% plants having purple colored auricles.

**'Doyce' Hulless Barley****18B. Exhibit B: Novelty Statement**

Doyce is the first winter hulless barley released by Virginia Tech and is uniquely different from all known barley cultivars. It is most similar to the hulled cultivar Price. Spikes of Doyce have long lemma awns that are longer than the spike in length and lateral kernels do not overlap. In contrast, spikes of Price have short lemma awns that are less than equal to the spike in length and lateral kernels of one third to one half of the spike overlap. Seedlings of Doyce are resistant (0=Resistant to 4=Susceptible scale) to leaf rust (*Puccinia hordei*) races 8, 30, and ND89-3 (Infection types = 12C, 1, and 1C, respectively), while seedlings of Price are resistant (IT = 0;) to race 8 (virulence for genes *Rph1*, 4, 8, 10, and 11), moderately susceptible (IT = 23C) to race 30 (virulence for genes *Rph1*, 2, 4, 6, 7, 8, and 11), and susceptible (IT=3) to race ND89-3 (virulence for genes *Rph1*, 2, 4, 5, 6, 7, 8, 9, 10, 11). Hulless check cultivar H585 (SC890585) is moderately susceptible to race 8 (IT=23) and susceptible to races 30 (IT=4) and ND89-3 (IT=3C). Doyce has consistently been more resistant to leaf rust in field tests than Price and H585 as noted in the table below. Ratings based on disease severity where 0=Resistant, lacking sporulating pustules to 9=Susceptible with sporulating pustules nearly covering leaves.

	2001 Lr (0-9)	2002 Lr (0-9)	2003 Lr (0-9)	2004 Lr (0-9)
<b>Doyce</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Price</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>4</b>
<b>H585</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>7</b>
<b>L.S.D.</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>2.0</b>
<b>N=No. of tests</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK AND SEED DIVISION  
BELTSVILLE, MARYLAND 20705

EXHIBIT C  
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S) Virginia Tech Intellectual Properties, Inc.	FOR OFFICIAL USE ONLY PVPO NUMBER <b>200500267</b>
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) 1872 Pratt Dr., Ste. 1625 Blacksburg, VA 24060	VARIETY NAME OR TEMPORARY DESIGNATION Doyce / (VA00H-137)

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (i.e.  or ) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

<input type="text" value="3"/> 1 - SPRING	<input type="text" value="2"/> 2 - FACULTATIVE WINTER	<input type="text" value="3"/> 3 - WINTER	<input type="text" value="2"/> Early Growth: 1 - PROSTRATE	<input type="text" value="2"/> 2 - SEMIPROSTRATE
			<input type="text" value="3"/> 3 - ERECT	

2. MATURITY (50% Flowering):

<input type="text" value="2"/> 1 - EARLY (California Mariout)	<input type="text" value="2"/> 2 - MIDSEASON (Betzes)	<input type="text" value="3"/> 3 - LATE (Frontier)
<input type="text" value="1"/> No. of days Earlier than ..... <input type="text" value="8"/>	<input type="text" value="1"/> 1 - BETZES	<input type="text" value="2"/> 2 - CALIFORNIA MARIOUT
<input type="text" value="2"/> No. of days Later than ..... <input type="text" value="9"/>	<input type="text" value="3"/> 3 - CONQUEST	<input type="text" value="4"/> 4 - DICKSON
	<input type="text" value="5"/> 5 - PIROLINE	<input type="text" value="6"/> 6 - PRIMUS
	<input type="text" value="7"/> 7 - UNITAN	<input type="text" value="8"/> 8 - WYSOR
	<input type="text" value="9"/> 9 - NOMINI	

3. PLANT HEIGHT (From soil level to top of head):

<input type="text" value="2"/> 1 - SEMIDWARF	<input type="text" value="2"/> 2 - SHORT (California Mariout)	<input type="text" value="3"/> 3 - MEDIUM TALL (Betzes)	<input type="text" value="4"/> 4 - TALL (Conquest)
<input type="text" value="1"/> <input type="text" value="8"/> Cm. Shorter than ..... <input type="text" value="9"/>	<input type="text" value="1"/> 1 - BETZES	<input type="text" value="2"/> 2 - CALIFORNIA MARIOUT	<input type="text" value="3"/> 3 - CONQUEST
<input type="text" value="0"/> <input type="text" value="8"/> Cm. Taller than ..... <input type="text" value="8"/>	<input type="text" value="4"/> 4 - DICKSON	<input type="text" value="5"/> 5 - PIROLINE	<input type="text" value="6"/> 6 - PRIMUS
	<input type="text" value="7"/> 7 - UNITAN	<input type="text" value="8"/> 8 - CALLAO	<input type="text" value="9"/> 9 - NOMINI

4. STEM:

<input type="text" value="2"/> Exertion (Flag to spike at maturity):	1 - 0 - 3 cm.	<input type="text" value="1"/> Anthocyanin:	1 - ABSENT	<input type="text" value="2"/> 2 - PRESENT
	2 - 3 - 10 cm.			
	3 - 10 - 15 cm.			
<input type="text" value="0"/> <input type="text" value="5"/> NO. OF NODES (Originating from node above ground)				

<input type="text" value="1"/> Collar Shape:	1 - CLOSED	<input type="text" value="1"/> Shape of Neck:	1 - STRAIGHT	<input type="text" value="2"/> 2 - SNAKY
	2 - V-SHAPED		3 - OTHER (Specify) _____	
	3 - OPEN			
	4 - MODIFIED CLOSED OR OPEN			

5. LEAF:

<input type="text" value="1"/> Basal leaf sheath (seedling):	1 - GLABROUS	<input type="text" value="1"/> Position of flag leaf (at boot stage):	1 - DROOPING
	2 - PUBESCENT		2 - UPRIGHT
<input type="text" value="2"/> Waxiness:	1 - ABSENT (Glossy)	<input type="text" value="1"/> <input type="text" value="7"/> MM. WIDTH (First leaf below flag leaf)	
	2 - SLIGHTLY WAXY		
	3 - WAXY	<input type="text" value="1"/> Anthocyanin in leaf sheath:	1 - ABSENT
<input type="text" value="2"/> <input type="text" value="1"/> CM. LENGTH (First leaf below flag leaf)			2 - PRESENT

6. HEAD:

<input type="text" value="2"/> Type:	1 - TWO-ROWED	<input type="text" value="2"/> Density:	1 - LAX	<input type="text" value="2"/> 2 - ERECT (Not dense)
	2 - SIX-ROWED		3 - ERECT (Dense)	
<input type="text" value="4"/> Shape:	1 - TAPERING	<input type="text" value="1"/> Waxiness:	1 - ABSENT (Glossy)	<input type="text" value="2"/> 2 - SLIGHTLY WAXY
	2 - STRAP		3 - WAXY	
	3 - CLAVATE			
	4 - OTHER (Specify) <u>Tapering &amp; Parallel</u>	<input type="text" value="3"/> Rachis (Hair on edge):	1 - LACKING	<input type="text" value="2"/> 2 - FEW
<input type="text" value="1"/> Lateral Kernels Overlap:	1 - NONE		3 - COVERED	
	2 - AT TIP			
	3 - 1/4 - 1/2 OF HEAD			

7. GLUME:

<input type="text" value="2"/> Length:	1 - 1/3 OF LEMMA	<input type="text" value="3"/> Hairs:	1 - NONE	<input type="text" value="2"/> 2 - SHORT
	2 - 1/2 OF LEMMA		3 - LONG	
	3 - MORE THAN 1/2 OF LEMMA			
<input type="text" value="3"/> Hair covering:	1 - NONE	<input type="text" value="3"/> 3 - CONFINED TO BAND	<input type="text" value="4"/> 4 - COMPLETELY COVERED	
	2 - RESTRICTED TO MIDDLE			
<input type="text" value="3"/> Awns:	1 - LESS THAN EQUAL TO LENGTH OF GLUMES	<input type="text" value="2"/> 2 - EQUAL TO LENGTH OF GLUMES		
	3 - MORE THAN EQUAL TO LENGTH OF GLUMES			
<input type="text" value="3"/> Awn Surface:	1 - SMOOTH	<input type="text" value="2"/> 2 - SEMISMOOTH	<input type="text" value="3"/> 3 - ROUGH	

## 8. LEMMA:

- 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS AWNLESS ON LATERAL ROWS  
 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)  
 5 = LONG (longer than spike) 6 = HOODED
- 4 Awn Surface: 1 = AWNLESS 2 = SMOOTH 3 = SEMISMOOTH 4 = ROUGH
- 2 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS 1 Hair: 1 = ABSENT 2 = PRESENT
- 2 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 2 Rachilla Hairs: 1 = SHORT 2 = LONG  
 3 = TRANSVERSE CREASE

## 9. STIGMA:

- Hairs: 1 = FEW 2 = MANY

## 10. SEED:

- 1 Type: 1 = NAKED 2 = COVERED 1 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT
- 1 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)  
 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)
- 1 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED
- 1 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE
- PERCENT ABORTIVE: 3 1 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- 0 SEPTORIA 1 NET BLOTCH 0 SPOT BLOTCH 2 POWDERY MILDEW
- 0 LOOSE SMUT 0 BACTERIAL BLIGHT 0 COVERED SMUT 0 FALSE LOOSE SMUT
- 0 STEM RUST 2 LEAF RUST 1 SCAB 0 SCALD
- 0 AY 0 BSMV 2 BYDV 2 OTHER (Specify) Stripe Rust

## 12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

- 0 GREEN BUG 0 ENGLISH GRAIN APHID 0 CHINCH BUG 0 ARMYWORM
- 0 GRASS HOPPERS 0 CERIAL LEAF BETTLE 0 OTHER (Specify)
- HESSIAN FLY RACES { 0 GP 0 A 0 B 0 C  
 0 D 0 E 0 F 0 G

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- 0 DOT 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Pamunkey	Seed size	Pamunkey
Leaf size	Pamunkey	Coleoptile elongation	
Leaf color	Pamunkey	Seedling pigmentation	Pamunkey
Leaf carriage	Pamunkey		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

- Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
- Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture, pp. 61 - 84.
- Making Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

**'Doyce' Hulless Barley****18D. Exhibit D: Additional Description of Doyce Hulless Barley.**

Doyce is a high yielding, moderately-late maturing, long awned, six-row hulless winter barley with very good straw strength and test weight. In Virginia, head emergence of Doyce is 3 days later than the hulless check H585 (SC890585), 1 day later than Nomini and similar to Price (Tables 1-7). Average plant height of Doyce (32 inches) is 7 inches shorter than Nomini (39 inches), 2 inches taller than Callao (30 inches), similar to Price (32 inches) and 2 inches shorter than H585 (34 inches). Straw strength (0=no lodging, 10=completely lodged) of Doyce (3.2) was similar to those of Nomini (2.5) and Price (2.6) but was significantly ( $P \leq 0.05$ ) better than that of Callao (6.1).

Average grain yield (2000-2001) of Doyce (92 Bu/ac) in Virginia's official variety yield trial (Table 1) was better in comparison with the two hulless checks H585 (SC890585) and SC880248 (82 Bu/ac and 85 Bu/ac respectively). In the same trial, grain yields of Doyce exceeded ( $P \leq 0.05$ ) those of H585 by 9-11 Bu/ac (Table 1-3). Average test weight of Doyce (56.0 Lb/Bu) in Virginia (Table 1-7) has been only slightly lower (1.0 Lb/Bu) than that of H585, but has been significantly ( $P \leq 0.05$ ) higher than Nomini (48.9 Lb/Bu).

Doyce is resistant to powdery mildew (*Blumeria graminis* f. sp. *hordei*) and leaf rust (*Puccinia hordei*). It is moderately susceptible to net blotch (*Pyrenophora teres*).

**Table 1. Two-year summary of performance of Doyce in the Virginia Tech Barley Tests, 2001-2002 harvests.\***

Line	Yield (Bu/acre) (10)	Test Weight (Lb/bu) (8)	Date Headed (Mar. 31+) (8)	Height (In) (7)	Lodging♥ (0.2-10) (7)	Leaf Rust (0-9) (4)
<b>DOYCE</b>	92 -	57.2 +	22 +	32 -	3.2	1 -
H585	82 -	57.4 +	19 -	34	2.1 -	7 +
SC880248	85 -	57.4 +	20	35 +	2.6	6 +
Nomini	110 +	48.9 -	20	39 +	2.4 -	3 -
Price	109 +	50.9 -	20	32 -	2.5	4
Callao	103 +	51.4 -	17 -	30 -	6.3 +	3 -
Average (n=6)	97	53.9	20	34	3.2	4
C.V.	9	2.2	7	3	44.3	18
L.S.D. (0.05)	4	0.6	1	1	0.8	1

\* A plus or minus sign indicates a performance significantly above or below the test average.

The number in parentheses below column headings indicates the number of location-years on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is barley standing upright and 5 is barley totally flat.

♦ The 0-9 ratings indicate degree to which plant is affected, where 0 = none and 9 = total plant is affected.

Table 2. Summary of performance of Doyce in the Virginia Tech Barley Test, 2002 harvest.\*

	Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Mar31+)	Height (In)	Leaf Rust	Powdery Mildew (0-9)	Net Blotch	Spring Freeze Damage (%)	Early Height (In)	Lodging (0.2-10)
<b>Hulled Lines</b>	(5)	(4)	(4)	(4)	(2)	(1)	(1)	(1)	(1)	(3)
NOMINI	113 +	50.0 -	17	40 +	3	0	2 -	3	6.3	3.2
PRICE	109	51.7	16 -	32	4 +	0	6	8	6.0	3.1
CALLAO	101 -	52.8 +	15 -	30 -	3	0	5 -	15	6.0	4.4 +
Statewide Average (n=29)	107	51.7	17	32	3	0	6	9	6.7	3.2
LSD (0.05)	5	0.8	1	1	1	1	1	15	1.2	0.8
C.V.	8	2.4	6	4	34	420	14	120	12.4	31.4
<b>Hulless Lines</b>										
DOYCE	89 +	56.1	18 +	32 -	1 -	0	8 +	21	8.3	2.9
H585	78 -	56.0	14 -	35 +	8 +	0	8 +	20	7.5	2.9
SC880248	83	56.0	15	35 +	7 +	0	8 +	16	9.3	3.0
Statewide Average (n=18)	84	56.8	15	33	5	0	7	23	8.3	2.7
LSD (0.05)	4	1.0	1	1	1	0	1	19	1.1	0.7
C.V.	8	7.0	7	4	20	606	12	58	9.2	31.2

\* Varieties are ordered by descending statewide yield averages. A plus or minus sign indicates a performance significantly above or below the test average, where hulled and hulless lines have been statistically analyzed separately.

The number in parentheses below column headings indicates the number of locations on which data are based.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected. Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is barley standing upright and 5 is barley totally flat. Hulless barley is similar to hulled barley except the glumes thrash free of the seed when combined. Since the hulls make up about 15% of the dry grain weight, yields of hulless barley are expected to be about 15% lower than hulled barley.

Spring freeze damage is the percentage of tillers killed by a low temperature of 21 degrees F. on March 2-3, 2002. Ratings were made on April 29, 2002.

Early height is an indication of the daylength sensitivity of a variety. The association between early growth and freeze injury in barley is much lower than in wheat.

Table 3. Summary of performance of Doyce in the Virginia Tech Barley Test, 2001 harvest.\*

Line	Yield (Bu/acre) (5)	Test Weight (Lb/bu) (4)	Date Headed (Mar. 31+) (4)	Height (In) (3)	Lodging♥ (0.2-10) (4)	Leaf Rust (0-9)♦ (1)	Spring Freeze Damage (1)
DOYCE♣	96	58.3 +	27 +	32 -	3.5	2 -	2 -
H585♣	87 -	58.8 +	24	34 +	1.4 -	7 +	3 -
SC880248♣	87 -	58.8 +	25 +	35 +	2.2	5 +	3 -
PRICE	110 +	50.2 -	25 +	31 -	2.1	4 +	4
NOMINI	106	47.7 -	23 -	38 +	1.8 -	4 +	2 -
CALLAO	104	50.1 -	20 -	30 -	7.7 +	3	5 +

Test Average n=41)	101	52.2	24	33	3.1	3	4
L.S.D. (0.05)	7	0.6	1	1	1.1	1	1
C.V.	10	1.6	8	3	50.5	23	13

\* Varieties are ordered by descending statewide yield averages. A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of locations on which data are based. There are four replications at each location, except at Orange which had two replications.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is barley standing upright and 5 is barley totally flat.

♦ The 0-9 ratings indicate degree to which plant is affected, where 0 = none and 9 = total plant is affected.

♣ These lines are hulless. Hulless barley is similar to hulled barley except the glumes thresh free of the seed when combined.

Since the hulls make up 10-13% of the dry grain weight, yields of hulless barley are expected to be 10-13% lower than hulled barley.

Table 4. Summary of performance of Doyce in the 2002 Advance Hulless Barley Yield Test in Virginia (Warsaw and Blacksburg). The number below each column heading indicates the number of locations upon which data are based.

Line	Yield (bu/A)	Rank According to Yield (N=46)	Test Weight (lbs/bu)	Heading Date (March 31+)	Early Plant Height (in.) <sup>1</sup>	Mature Plant Height (in.)	Lodging (0.2-10) <sup>2</sup>	Net Blotch (0-9) <sup>3</sup>	Powdery Mildew (0-9)	Leaf Rust (0- 9)
	2	2	2	2	1	2	2	1	1	1
Doyce	82.4	18	54.3	18	9.3	29	2.0	5	3	1
H585	68.6	41	54.5	14	7.7	32	1.5	6	0	7
SC880248	70.8	37	55.0	16	8.8	33	1.5	6	1	6
TX00D633	70.1	38	55.1	16	8.3	32	1.6	6	1	5
TX00D665	67.8	43	55.0	14	7.3	31	1.5	7	1	6
VA00H-24	74.1	31	55.1	14	8.5	29	1.0	5	0	5
VA00H-12	79.2	24	56.1	15	8.0	31	2.3	5	0	4
VA00H-15	81.6	20	55.2	16	9.7	33	3.6	5	1	5
VA00H-32	75.4	29	55.5	14	10.0	29	1.3	4	0	3
VA00H-93	83.1	16	54.8	17	9.3	31	1.9	5	2	5
VA00H-243	68.8	39	53.4	15	7.8	30	3.1	8	0	5
GRAND MEAN	78.3		54.6	15	8.2	31	1.8	5	1	4
LSD (0.05)	4.9		0.6	1	0.9	1	0.9	1	1	2
CV (%)	6.6		1.2	5	8.5	3	53.4	17	94	31

<sup>1</sup>Early plant height serves as an indicator for spring growth type.

<sup>2</sup>Belgian Lodging Scale = Area x Intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

<sup>3</sup>All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total infestation of the plants by the disease.

Table 5. Summary of performance of Doyce in the 2002 Preliminary Hulless Barley Yield Test in Virginia (Warsaw and Painter). The number under each column heading indicates the number of locations upon which data are based.

Line	Yield (bu/A)	Rank According to Yield (N=86)	Test Weight (lbs/bu)	Heading Date (March 31+)	Early Plant Height (in.) <sup>1</sup>	Mature Plant Height (in.)	Lodging (0.2-10) <sup>2</sup>	Powdery Mildew (0-9) <sup>3</sup>	Leaf Rust (0-9)
	2	2	2	2	1	2	2	1	2
Doyce	97.4	19	56.3	10	9.2	33	2.3	0	0
H585	83.3	79	58.1	8	8.7	35	2.7	0	5
SC880248	84.7	74	57.6	8	9.0	37	4.4	0	4
TX00D633	84.7	75	58.6	5	8.7	36	4.0	0	5
TX00D665	85.5	73	57.8	10	7.8	35	2.2	0	5
VA01H-15	94.7	33	56.4	10	10.2	31	1.8	1	0
VA01H-32	94.5	38	57.0	11	10.0	34	2.9	1	0
VA01H-70	90.3	62	57.4	12	10.5	37	5.5	0	1
VA01H-74	97.5	17	56.5	11	9.3	37	0.8	0	1
VA01H-93	82.8	81	57.9	6	12.2	31	5.6	0	1
GRAND MEAN	92.8		56.8	10	9.2	33	3.0	0	1
LSD (0.05)	5.1		1.1	1	1.5	1	1.2	1	1
CV (%)	5.3		1.9	9	12.0	4	37.2	190	68

<sup>1</sup>Early plant height serves as an indicator for spring growth type.

<sup>2</sup>Belgian Lodging Scale = Area x Intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

<sup>3</sup>All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total infestation of the plants by the disease.

Table 6. Summary of performance of Doyce in the 2001 Preliminary Hulless Barley Test in Virginia. The number under each column heading indicates the number of locations upon which data are based. The test was conducted in Blacksburg and Warsaw, Virginia.

Line	Yield (bu/a)	Rank <sup>1</sup>	Heading					
			Test Weight (lbs/bu)	Date (March 31+)	Plant Height (in.)	Freeze Damage (0-9) <sup>2</sup>	Lodging (0.2-10) <sup>3</sup>	Leaf Rust (0-9)
	2	2	2	2	2	1	1	2
Doyce	83.5	65	53.7	26	32	1	8.7	1
H585	85.5	47	54.8	24	33	2	6.0	5
SC880248	88.0	30	54.2	25	34	2	8.3	3
VA00H-12	78.5	93	56.0	25	33	3	4.7	3
VA00H-15	88.1	26	54.9	25	35	2	9.0	4
VA00H-24	93.0	1	55.3	20	31	1	6.7	4
VA00H-32	80.3	86	54.5	21	31	0	6.0	3
VA00H-243	84.0	64	53.8	24	34	1	7.3	3
GRAND MEAN	85.5		54.5	24	33	2	6.0	3
LSD (0.05)	6.7		0.7	1	1	1	2.7	1
CV (%)	8.3		1.4	3	4	28	33.8	31

<sup>1</sup> Rank according to yield (N=96).

<sup>2</sup> All 0-9 ratings indicate relative disease/freeze damage severity: 0 = no disease/freeze damage present; 9 = total infestation of plants by the disease/freeze damage.

<sup>3</sup> Belgian Lodging Scale = Area x Intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

Table 7. Summary of performance of Doyce in the 2000 Replicated Hulless Barley Observation Test, Warsaw, VA.

Line	Yield (bu/a)	Percent of Test Mean (Yield)	Test Weight (lbs/bu)	Heading Date (March 31+)	Plant Height (in)	Lodging (0.2-10) <sup>1</sup>	Powdery Mildew (0-9) <sup>2</sup>	Leaf Rust (0-9)	Spot/Net Blotch (0-9)
Doyce	95.5	113.4	56.9	13	36	1.3	2	1	6
H585	79.3	94.2	58.4	10	38	1.1	0	3	4
SC880248	78.1	92.7	59.0	11	38	1.2	1	3	4
VA00H-32	92.1	109.4	58.6	8	34	0.9	1	4	4
VA00H-243	91.2	108.3	57.7	9	37	1.5	0	3	6
Mean	84.2		57.1	10	36	1.4	1	3	5
C.V.	6.6		0.8	7	3	40.1	76	27	20
LSD	7.6		0.6	1	2	0.8	1	1	1

<sup>1</sup> Belgian lodging scale = area x intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

<sup>2</sup> All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total plant infection.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

**EXHIBIT E**  
**STATEMENT OF THE BASIS OF OWNERSHIP**

1. NAME OF APPLICANT(S)  Virginia Tech Intellectual Properties, Inc.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER  VA00H-137	3. VARIETY NAME  Doyce
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)  1872 Pratt Drive Suite 1625 Blacksburg, VA 24060	5. TELEPHONE (Include area code)  540-951-9374	6. FAX (Include area code)  540-951-5292
7. PVPO NUMBER  <b>200500267</b>		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☐ X YES ☐ NO9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☐ X YES ☐ NO10. Is the applicant the original owner? ☐ YES ☐ X NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ X YES ☐ NO If no, give name of country

11. Additional explanation on ownership (If needed, use the reverse for extra space):

Original owner Virginia Polytechnic Institute and State University assigned its ownership to current owner Virginia Tech Intellectual Properties, Inc. (See Attached document).

**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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GROUP GERMPLASM ASSIGNMENT

VTIP 03.017	VA97W-24
VTIP 03.018	VA98W-586
VTIP 03.019	VA98W-706
VTIP 03.020	VA98W-750
VTIP 03.021	VA98W-817
VTIP 03.022	DAN/VA97B-388 Barley
VTIP 03.023	DOYCE/VA00H-137 Barley
VTIP 03.024	VT67 and VT120 Soybean

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY (hereinafter referred to as the "UNIVERSITY"), assigns to VIRGINIA TECH INTELLECTUAL PROPERTIES, INC. (hereinafter referred to as "VTIP") all rights, title and interest in and to all of the above-listed GERMPLASMS as held by the UNIVERSITY.

The UNIVERSITY, by its authorized agents, agrees that it will execute all necessary assignments as requested by VTIP, to facilitate the filing of patent applications and/or copyright registrations. It will render any reasonable assistance requested to aid in preparation of such applications and/or registrations.

The UNIVERSITY shall retain the right to make use of the GERMPLASMS for internal research and other non-commercial purposes without cost to the UNIVERSITY.

All royalties, rents, payments, or any cash receipts from the sale, assignment, transfer, licensing or use of the GERMPLASMS shall be the property of VTIP and shall be distributed according to the provisions of the Virginia Agricultural Experiment Station (VAES) Plant Germplasm Release Policy (PGRP).

Prior to the execution of this Assignment, the UNIVERSITY has not granted the right of license to make, use, or sell said GERMPLASMS to anyone except to VTIP, nor has it otherwise encumbered its rights, title and interest in said GERMPLASMS, and it will not execute any instrument in conflict with this Assignment.

IN WITNESS WHEREOF, the UNIVERSITY has caused this Assignment to be signed this 25 day of March, 2003.

VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY

BY 

MINNIS E. RIDENOUR  
Chief Operating Officer

STATE OF VIRGINIA

COUNTY OF MONTGOMERY, to-wit:

The foregoing instrument was acknowledged before me this 25<sup>th</sup> day of  
March, 2003, by Marion E. Ridenour  
of Virginia Polytechnic Institute and State University, on behalf of said University.

Gerry M. Chenalet  
Notary Public

My commission expires: 2/28/07